Bioengineered Tumour Models to Study Cancer Plasticity and Metastasis Driven by Epigenetic Regulators in Melanoma

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Metastatic melanoma accounts for the majority of skin cancer deaths due to its aggressiveness and often treatment-resistant nature.[1] The high phenotypic heterogeneity and plasticity in melanoma are major contributing factors to tumour progression and metastatic spread.[2] Bioengineered tumour models have revolutionized our understanding of cancer biology and are now increasingly being used to investigate molecular mechanisms driving tumour growth and progression.[3] One such mechanism is epigenetic regulation, which can modulate gene expression, affect cellular behaviour and plays a critical role in cancer plasticity and metastasis. Here, we show the use of specialised 3D bioengineered tumour matrices to study the role of the epigenetic regulator PRDM14 in metastatic melanoma. Overexpression of PRDM14 has been associated with tumour growth, invasion, and metastasis in several solid tumours, however, its role in melanoma progression is yet to be fully elucidated. Our novel tumour biomimetic models allow for defined control of mechanical (stiffness), interfacial (geometry) and material (ligand) properties to control tumour growth and invasion via PRDM14 expression.

Establishing tailored, accurate and physiological relevant 3D model systems will enable the exploration of remaining critical biological questions, such as the impact of PRDM14 regulation in metastatic melanoma, as well as defining the role and identity of relevant microenvironmental cues.

References:

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